Section 13 Asset Class – Traffic Safety Structures & Devices:

The Traffic Safety Structures & Devices asset class includes all of the SDOT assets whose main purpose is to provide a reasonably safe transportation system. It includes:

- ✓ Chicanes
- ✓ Crash Cushions
- ✓ Curb Bulbs
- ✓ Guardrails
- ✓ Median Islands
- ✓ Speed Cushions
- ✓ Speed Dots
- ✓ Speed Humps
- ✓ Traffic Circles

Primary responsibility for traffic safety structures and devices lies with the Traffic Operations group of the Traffic Management Division.

Many of these assets have been installed as a component of a CIP project, or under the Neighborhood Spot Improvement, Neighborhood Traffic Control Program, or Neighborhood Street Fund CIP project in response to a citizen or neighborhood interest. These are traffic calming devices that supplement the more traditional traffic control devices, such as regulatory signs. These assets are not maintained through a regular maintenance program, and maintenance is currently performed on an emergency damage/repair basis that is often directed by customer request. Repair is handled either by the Street Maintenance Division as part of its spot safety repair program or by Traffic Maintenance crews. Maintenance costs are not tracked separately for these assets. Funding has generally been considered adequate for many of these assets based on the level of customer request received. The Traffic Management Division may revisit the need for a regular maintenance program and request additional funding if it concludes that these assets require more aggressive maintenance.

Chicanes:

A chicane is a set of landscaped curb extensions that extend out into the street, narrowing the road to one lane, thereby forcing motorists to decrease vehicle speed in order to maneuver between them. Chicanes increase safety and also encourage walking as a mode of travel.

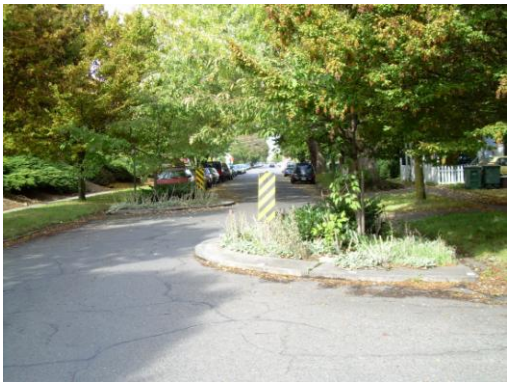
Current Inventory and Anticipated Annual Growth:

There are nineteen (22) chicanes within the city of Seattle.

The inventory of chicanes is maintained in manual files in the Traffic Operations engineering office and is based on installation records.

The anticipated annual growth in new chicanes has not been determined.

The estimated replacement value of the chicanes is $304,000 in current dollars.



Chicane

Condition Ratings, Useful Life and Life Cycle Costs, and Maintenance Approach:

Chicanes are not regularly inspected and are maintained on a customer request basis. Age is often used as a surrogate for the condition of a chicane. When newly installed, the expected useful life of a chicane is twenty (20) years. It degrades to fair condition in fifteen (15) years, and, when it reaches the end of its expected useful life, it is considered in poor condition and is eligible for replacement.

In 2010, a newly installed chicane costs approximately $16,000. Maintenance costs are not tracked at the chicane level and are included in a general maintenance budget, hence, life cycle costs are not available.

Current Performance Measures:

Performance measures have not been developed for chicanes.

Funding Requirements and Unmet Funding Needs:

Funding is generally considered adequate based on the level of customer request.

Crash Cushions:

Crash Cushion

A crash cushion is a disposable device used to increase safety for motor vehicle operators and passengers who collide with safety barriers in gore areas. Crash cushions improve safety and also help protect the transportation infrastructure.

Current Inventory and Anticipated Annual Growth:

A field inventory conducted in 2009 verified 40 crash cushions in SDOT ownership in the city of Seattle. .

The inventory of crash cushions is maintained in the Hansen system by Traffic Operations staff based on field inventory conducted in 2008. This inventory also determined condition data.

The anticipated annual growth in new crash cushions has not been determined.

The estimated replacement value of crash cushions is $746,000 in current dollars.

Condition Ratings, Useful Life and Life Cycle Costs, and Maintenance Approach:

Crash cushions are not regularly inspected and are maintained on a customer request or incident basis. Age is used in determining a replacement cycle. When newly installed, the expected useful life of a crash cushion is ten (10) years. It degrades to fair condition in eight (8) years, and, at the end of its useful life, it is considered in poor condition and is eligible for replacement. If a crash cushion is damaged in a collision, it is replaced. The 2008 inventory collected the following condition data on crash cushions.

Crash Cushion Condition Rating
2008

% in Good Condition	% in Fair Condition	% in Poor Condition
80%	15%	5%

In 2010, a newly installed crash cushion costs approximately $18,650. Maintenance costs are not tracked at the crash cushion level and are included in a general maintenance budget, hence, life cycle costs are not available.

BTG has provided the opportunity to replace crash cushions on a programmed basis.

Current Performance Measures:

BTG funding has established the following performance measures for crash cushions:

Performance Measure	2009 Actual	2010 Goal
Crash cushions replaced	2	2

Funding Requirements:

Emergency repair or replacement of crash cushions is incident driven and therefore spending may be highly variable year to year. SDOT Traffic Operations has funding sufficient for a planned two per year replacement. As of 2010, Traffic Operations has an additional $45,000 planned for new or replacement crash cushions. Sustaining this funding level will allow the Department to replace all crash cushions within the estimated useful life of ten years.

Unmet Funding Needs:

Funding is adequate for the current replacement program

Curb Bulbs:

Curb bulbs are extensions of the sidewalk or curb line into the parking lane that physically narrow the roadway, thereby reducing pedestrian crossing distance. Curb bulbs improve pedestrian safety by increasing the amount of protected, dedicated space for walking and encourage walking as a mode of transportation.

Current Inventory and Anticipated Annual Growth:

There are an estimated 92 curb bulbs within the city of Seattle.

The inventory of curb bulbs is maintained in manual files in the Traffic Operations engineering office and is based on installation records.

Curb Bulb

The anticipated annual growth in curb bulbs has not been determined.

The estimated replacement value of the curb bulbs is in excess of $2,451,800 in current dollars.

Condition Ratings, Useful Life and Life Cycle Costs, and Maintenance Approach:

Curb bulbs are not regularly inspected and are maintained on a customer request basis. Age is often used as a surrogate for the condition of a curb bulb. When newly installed, the expected useful life of a curb bulb is twenty (20) years if asphalt, and forty (40) years if concrete. It degrades to fair condition in fifteen (15) years if asphalt, and thirty (30) years if concrete. At the end of its useful life, it is considered in poor condition and eligible for replacement.

In 2010, a newly installed curb bulb costs in the range of 26,000-$50,000 depending on size, materials, and field conditions. Maintenance costs are not tracked at the curb bulb level and are included in a general maintenance budget; hence, life cycle costs are not available.

Current Performance Measures:

Performance measures have not been developed for curb bulbs.

Funding Requirements and Unmet Funding Needs:

Funding is generally considered adequate based on the level of customer request.

Guardrails:

Guardrails are devices designed to keep pedestrians and motor vehicles from straying off the road into potentially dangerous or off-limit areas of the ROW. Guardrails improve safety and also protect the transportation infrastructure.

Current Inventory and Anticipated Annual Growth:

Typical Guardrail

There are 73,000 linear feet of guardrail in 811 units within the city of Seattle.

The inventory of guardrails is maintained in the Hansen system by Traffic Operations engineering staff and is based on a field inventory conducted in 2008.The anticipated annual growth in guardrails has not been determined.

The estimated replacement value of the guardrails is $3,254,583 in current dollars.

Condition Ratings, Useful Life and Life Cycle Costs, and Maintenance Approach:

Guardrails are not regularly inspected and are maintained on a customer request basis. Age is used in determining a replacement cycle.. When newly installed, the expected useful life of a guardrail is 25 years. It degrades to fair condition in 17 years, and, at the end of its useful life, it is considered in poor condition and eligible for replacement. The filed inventory conducted in 2008 collected the following data on condition:

Guardrail Condition Rating
2008

% in Good Condition	% in Fair Condition	% in Poor Condition	Condition undetermined
44%	47.6%	6.9%	1.5%

In 2010, a newly installed guardrail costs approximately $1,000 per 12-foot segment which will escalate to $2095 per 12-foot segment in 25 years (2010 inflated dollars). Maintenance costs are not tracked at the guardrail level and are included in a general maintenance budget; hence, life cycle costs are not available.

BTG funding has provided the opportunity to replace aging guardrail on a programmed basis using the condition data as input. SDOT Traffic Operations is replacing poor and fair condition guardrail.

Current Performance Measures:

Performance Measure	2009 Actual	2010 Goal
Linear feet of guardrail replaced	2086	3,625

Funding Requirements and Unmet Funding Needs:

Emergency repair or replacement of guardrails is incident driven and therefore spending may be highly variable year to year. SDOT Traffic Operations has funding sufficient for the planned replacement goal. Sustaining this funding level will allow the Department to replace all the existing guardrail well within 20 years, or well within the estimated useful life of 25years. The replacement goals may be reevaluated as Traffic Operations reevaluates inventory overall condition, once all poor and fair guardrail is corrected..

Since maintenance costs are not tracked at the guardrail level, the adequacy of funding for emergency repair of guardrails has not been determined.

Median Islands:

A median island is a physical barrier that divides a street into two or more roadways. It serves as a place of refuge for pedestrians crossing the roadway and also restricts certain vehicular turning movements. Median islands increase safety and also encourage walking as a mode of transportation.

Pedestrian Refuge Island, a Type of Median Island

Current Inventory and Anticipated Annual Growth:

The inventory of median islands is maintained in manual files in four (4) separate locations by the sponsor of the project under which the median island was installed: Arterial Operations, Neighborhood Traffic Calming, Bicycle/Pedestrian, and Capital Projects. The manual files are based on installation records.

A total count of the median islands was not obtained for this report. A field inventory of median islands is not yet scheduled in favor of focusing limited resources on other critical assets.

The anticipated annual growth in median islands has not been determined.

The estimated replacement value of median islands has not been determined.

Condition Ratings, Useful Life and Life Cycle Costs, and Maintenance Approach:

Median islands are not regularly inspected and are maintained on a customer request basis. Age is often used as a surrogate for the condition of a median island. When newly installed, the expected useful life of a median island is twenty (20) years if asphalt, and forty (40) years if concrete. It degrades to fair condition in fifteen (15) years if asphalt, and thirty (30) years if concrete. At the end of its useful life, it is considered in poor condition and eligible for replacement.

In 2010, a newly installed median island costs approximately $535-1065 per foot which is expected to escalate to $ 963 - $3477per foot (2010 inflated dollars) in 20-40 years. Maintenance costs are not tracked at the median island level and are included in a general maintenance budget, hence, life cycle costs are not available.

Current Performance Measures:

Performance measures have not been developed for median islands.

Funding Requirements and Unmet Funding Needs:

Funding is generally considered adequate based on the level of customer request.

Speed Cushions:

A speed cushion is a set of several small speed humps that are installed across the width of the roadway with space in between. Spacing of the speed humps is designed to force cars to slow down as one or both wheels ride over one of the humps. The spacing is also designed to allow wider-axle emergency vehicles to pass through without slowing down. Speed cushions reduce motor vehicle speeds in neighborhoods and encourage walking as a mode of transportation. Historically, they have been constructed of either asphalt, or installed as bolt-on prefabricated rubber devices.

Current Inventory and Anticipated Annual Growth:

There are 19 sets of speed cushions within the city of Seattle.

The inventory of speed cushions is maintained in manual files in the Traffic Operations engineering office and is based on installation records.

The anticipated annual growth in speed cushions has not been determined.

The estimated replacement value of the speed cushions is $222,775 in 2010

dollars.

Condition Ratings, Useful Life and Life Cycle Costs, and Maintenance Approach:

Speed cushions are not regularly inspected and are maintained on a customer request basis. Age is often used as a surrogate for the condition of a speed cushion. When newly installed, the expected useful life of a speed cushion is ten (10) to twenty (20) years, depending on construction method. It

degrades to fair condition in seven (7) years. At the end of its useful life, it is considered in poor condition and eligible for replacement.

In 2010, a newly installed set of speed cushion costs approximately $$10660 -$12790 which is expected to escalate to $ 14,325 -17,190 (2010 inflated dollars) when the speed cushion is replaced at the end of its useful life. Maintenance costs are not tracked at the speed cushion level and are included in a general maintenance budget, hence, life cycle costs are not available.

Current Performance Measures:

Performance measures have not been developed for speed cushions.

Funding Requirements and Unmet Funding Needs:

Funding is generally considered adequate based on the level of customer request.

Speed Dots:

A speed dot is a raised section of pavement in the middle of an intersection that is intended to slow traffic.

There are 2 speed dots in the city.

No further information on speed dots was pursued for this report period.

Speed Dot

Speed Humps:

A speed hump is a paved mound in the street that forces motor vehicles to slow down. Speed humps improve safety and encourage walking as a mode of transportation. They are typically constructed of asphalt concrete.

Current Inventory and Anticipated Annual Growth:

There are 73 speed humps within the city of Seattle.

The inventory of speed humps is maintained in manual files in the Traffic Operations engineering office and is based on installation records.

The anticipated annual growth in speed humps has not been determined.

The estimated replacement value of the speed humps is $212,914 in 2010 dollars.

Condition Ratings, Useful Life and Life Cycle Costs, and Maintenance Approach:

Speed humps are not regularly inspected and are maintained on a customer request basis. Age is often used as a surrogate for the condition of a speed hump. When newly installed, the expected useful life of a speed hump is twenty (20) years if asphalt, and forty (40) years if concrete. It degrades to fair condition in fifteen (15) years if asphalt, and thirty (30) if concrete. At the end of its useful life, it is considered in poor condition and eligible for replacement.

In 2007, a newly installed speed hump costs approximately $3,700-$5,330which is expected to escalate to $6700-$17,385 (2010 inflated dollars) in 20-40 years. Maintenance costs are not tracked at the speed hump level and are included in a general maintenance budget, hence, life cycle costs are not available.

Current Performance Measures:

Performance measures have not been developed for speed humps.

Funding Requirements and Unmet Funding Needs:

Funding is generally considered adequate based on the level of customer request.

Traffic Circles:

Traffic circles are raised islands constructed at intersections of residential streets. Traffic circles provide separation of oncoming vehicles and cause motorists to decrease speed. Many of the traffic circles include landscaping that is maintained by a neighborhood group. Traffic circles increase safety for pedestrians and bicyclists and encourage walking and bicycling as modes of transportation. When landscaped, they also contribute to a more vibrant neighborhood.

Current Inventory and Anticipated Annual Growth:

There are 1,011 traffic circles within the city of Seattle.

The inventory of traffic circles is maintained in the Hansen system in the Traffic Operations engineering office and is based on installation records verified against an independent source.

The anticipated annual growth in traffic circles has not been determined.

Traffic Circle with Landscaping

The estimated replacement value of the traffic circles is $10,786,908 in 2010 dollars.

Condition Ratings, Useful Life and Life Cycle Costs, and Maintenance Approach:

Traffic circles are not regularly inspected and are maintained on a customer complaint basis. Age is used in determining a replacement cycle. When newly installed, the expected useful life of a traffic circle is 25 years. It degrades to fair condition in seventeen (17) years. At the end of its useful life, it is considered in poor condition and eligible for replacement. The inventory conducted in 2009 also determined condition ratings of the traffic circles as follows:

Traffic Circle Condition Rating
2009

% in Good Condition	% in Fair Condition	% in Poor Condition	Condition undetermined
95.6%	4%	.2%	.2%

In 2010, a newly installed traffic circle costs approximately $10,660. Maintenance costs are not tracked at the traffic circle level and are included in a general maintenance budget; hence, life cycle costs are not available.

Current Performance Measures:

Performance measures have not been developed for traffic circles.

Funding Requirements and Unmet Funding Need

Funding is considered adequate for the current level of activity.